Christini Venture FS-AWD

The mountain biker's biggest enemy isn't steep ascents or technical descents. It's not lactic acid build up, or a lack of good, legal places to ride. The biggest issue that's plagued mountain bikers since people began taking bicycles off road in earnest in the 1970's has been one of traction. The bikes that first hit the fire trails in California (or Europe, or Australia depending on whose tale of the origins of mountain biking you actually believe) had near-slick tyres that were intended for road use.

Tyre makers have searched for the perfect tread pattern to overcome slippery conditions throughout the development of mountain biking. Manufacturers have experimented with countless rubber compounds, knob cuts, and even metal studs in the last three decades, leading to the massive selection on the market today. The same quest has been undertaken by suspension designers who constantly attempt to create shocks that don't bob yet still enable the bike to 'sink into' corners and track straight through slick, slippery trail conditions. Although suspension also relieves stress on the rider and components, the benefits of squish on traction can't be denied. Need proof? Ride a dually on a slippery, mud and root-infested trail, then ride the same trail on a totally rigid steed.

Although these technological developments have made life easier for the mountain biker, and have allowed us to push the sport in directions neither envisaged nor imagined, we've still had to adjust to the limitations offered by our bikes. We're used to pitching our weight over the handlebars during steep climbs to keep the front wheel down, while at the same time maintaining enough weight on the back end to ensure constant traction. We're used to managing cornering in thick, wet mud or slippery roots by instinct—reacting to the way a bike bounces over terrain when wheels break traction. We're even used to paying particular attention to avoiding front-wheel washout on loose surfaces—especially while descending.

All these advances in bike technology and the compensations we've all made as riders have been rendered relatively insignificant next to the engineering feat achieved by Steve Christini, creator of the world's first commercially available full suspension all-wheel-drive mountain bike.

In the Lab

The idea of a two-wheel-drive bike is nothing new, yet no project has ever made it past the engineering prototypes and into full-scale production. Even Yamaha has spent many years developing an all-wheel-drive motorbike for off-road use, but so far it's yet to make it to market.

Essentially a gear sits inside the rear disc hub, powering a bevel-drive on an axle that runs up the frame's left seat stay. The axle is telescopic, to compensate for the rear suspension travel, and the curves in the line are handled by universal joints. The axle is solid all the way through the top tube, connecting to gears within the head tube. The drive is then taken to the front of the right fork leg, where a telescopic axle drives a bevel gear on the front hub. The gear ratio is set so the front and rear wheels travel at ever-so-slightly different speeds, which means that the front wheel isn't driv-

en in normal, straight-line riding, but is engaged as soon as the rear wheel slips.

The custom-built White Brothers forks are made without a steerer tube, as the gears occupy the space where it would otherwise sit. There's a curved alloy plate that attaches the top of the headset to the bottom on the front of the head tube that transfers the handlebar movement to the lower half of the fork. This provides a little flex in the steering system, as the plate isn't as stiff as a regular steerer tube. That said, it's hardly enough to worry about—even during high-speed cornering.

The entire system weighs 1.3kg (2.9lbs)—including bevel gears, drive, internal axles and telescopic suspension components. Best of all, it's also clutched, and a simple handlebar switch is used to disengage the AWD system and make it a traditional RWD. The AWD activation switch is actually a remote lock out lever sourced from Rock Shox—it looks similar to an early-90's Shimano thumb shifter. Thankfully, you don't really notice the extra weight on the trail. Built with a mix of reliable trail worthy parts our AWD test machine weighed 13.4kg (29.5lbs)—a very respectable complete bike weight when you consider that this 100mm (4-inch) travel dual suspension bike has all this extra technology incorporated within it.

On the Trail

The initial response from riding buddies when I arrived on the trail with the Christini was one of awe, followed by expressed concerns about weight and drive-train longevity. While we can't categorically provide any true long-term testing results on the durability of the design, Christini offers a two-year warranty on the drive-train system.

Not surprisingly, the biggest benefit of having two-wheel drive comes when climbing. It's difficult to adequately explain how much of a difference the front wheel makes in wet, sloppy or loose conditions. As soon as the rear wheel breaks traction, the front is engaged, effectively pulling you up and over obstacles that would stall most bikes. The rider simply has to remain evenly balanced on the bike and keep on pedalling to crest virtually any ascent in any trail condition—it was very impressive.

It also substantially helps cornering, as the front wheel tracks straight and through muddy, slippery corners. The bike digs into corners and carves through them—much like skis on loose powder. This allows you to brake later and carry more speed through a turn than a conventional bike.

Before you start reaching for the chequebook, I felt that the design does have a couple of faults. The front wheel travels further through a corner than the rear on all bikes—especially on tight, twisty trails with sharp turns. The slight difference in gearing is also designed to minimize front-wheel stutter on corners, and for the most part it works successfully. On fast, flowing trails, the front and rear wheels follow the same path, allowing the bike to dig right into corners and maintain power. Unfortunately, the front wheel chatters around tight, twisty turns as the front and rear wheel paths are different and there's no room for slip in the drive-train. I found it easier to disengage the front wheel drive during particularly tight descents.

Christini is also preparing a long travel, freeride version of the bike, which is currently in testing. Traction is the bane of downhillers and freeriders the world over, so we look forward to getting the chance to test ride the beefier model in a future issue.

Neezy, the company responsible for importing Santa Cruz bicycles and Maxm components has added Christini to its list of high-end products. As they also import Progressive Suspension, the Christini comes a 5th Element air shock. These air shocks are well suited to low pivot cross country trail bikes like the Christini as they can be tuned to reduce the amount of pedalling induced 'bob'. In Australia the bike will be available as a frame-only, or with a variety of build kits. In the US, Jeep is also selling the Christini's AWD bike under the 'Rubicon' moniker, so the concept is gaining some form of mainstream acceptance.

While two-wheel drive designs aren't going to replace conventional bikes in the next couple of years, they're certainly going to grow in popularity as riders come to appreciate the benefits of having both wheels providing traction and manufacturers work through minor design glitches. Remember, nobody expected dual suspension designs to enjoy the popularity they have either. mba

Article by Matt Overington

Photography by John Hardwick

Specification

Frame	Christini Venture AWD Alloy 100mm travel
Fork	White Brothers/Christini AWD 100mm travel
Head Set	Christini AWD specific
Stem	Titec Big-Al
Handlebars	Maxm Carbon Fibre
Brakes	Avid Cable discs
Shifters	Shimano LX
Front Derailleur	Shimano LX
Rear Derailleur	Shimano XT
Cassette	Shimano LX 11/34
Chain	Shimano HG-73
Crank	FSA V-Drive Extreme
Bottom Bracket	FSA ISIS Drive
Rims	Mavic X223 Disc
Hubs	Christini AWD Specific
Spokes	DT Swiss Butted Stainless Steel
Tyres	Kenda Karma Pro
Saddle	Selle Italia Trans-am XO
Seatpost	Maxm Composite
Weight	13.4kg (29.5lbs)
Price	Frame, fork & drive system $4,000. Complete as tested $6,600
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